WE CLAIM:

1. A method for leak testing of a part comprising:

A. presetting of a plurality of test parameters including:

(1) test pressure value;

(2) standard pressure differential value:

(3) total test time;

(4) snapshot time delay;

(5) slam test time;

(6) slam pressure differential value;

B. sealing of the test part with a fill line and a pressure sensing means attached thereto in fluid flow communication with respect to the sealed environment therewithin;

C. pressurizing of the test part by supplying fluid through the fill line into the part being tested while monitoring thereof;

D. ceasing pressurization of the test part;

E. pausing for a period of time of a duration equal to the snapshot time delay;

F. determining the snapshot pressure value by measuring the instantaneous current pressure within the pressurized part;

G. calculating the low good standard threshold

pressure by subtracting the standard differential value from the snapshot pressure value;

H. calculating the low good slam threshold pressure by subtracting the slam differential value from the snapshot pressure value;

I. measuring of the current pressure instantaneously within the part being tested;

J. delay for a period of time equal to the slam test time after determining the snapshot pressure value;

K. performing slam test by determining whether the measured current pressure is greater than the low good slam threshold pressure value, and, if yes, then proceeding to display the good part indicator and proceeding to depressurizing;

L. performing standard test by determining whether the measured current pressure is less than the low good standard threshold pressure, and, if yes, displaying bad part indicator and proceeding to depressurizing;

M. further performing of the standard test repeatedly until expiration of the total test time and then, if all standard tests result in a no result, proceeding to display a good part indicator and depressurizing; and

N. depressurizing the test part.

2. A method for leak testing of a part as defined in Claim 1 wherein said presetting of a plurality of test parameters further includes the following two test parameters:

A. maximum fill time; and

B. minimum fill time.

3. A method for leak testing of a part as defined in Claim 2 wherein said pressurizing of the test part by supplying fluid through the fill line into the part being tested while monitoring thereof comprises:

A. initiating pressurizing of the part by starting the flow of fluid through fill line into the test part;

B. determining whether the current pressure monitored has reached the test pressure value prior to expiration of the minimum fill time, and if yes, set and display a first error code and activate a test failure indicator and proceed to depressurizing the test part;

C. determining whether the current pressure monitored exceeds the test pressure value by a predetermined excess percentage level thereof, and if yes, set and display a second error code and activate a test failure indicator and proceed to

depressurizing the test part;

D. determining whether the current pressure has reached the test pressure value, and if yes, proceed to ceasing pressurization of the test part; and

E. determining whether the maximum fill time has expired since initiating pressurizing of the part the current pressure has failed to reach the test pressure value, and, if yes, set and display a third error code and activate a test failure indicator and proceed to depressurizing the test part, and if no, return to said determining whether the current pressure monitored has reached the test pressure value prior to expiration of the minimum fill time.

4. A method for leak testing of a part as defined in Claim 3 wherein the first error code indicates that a blockage exists within the test part that prevents pressurization of the entire test part.

5. A method for leak testing of a part as defined in Claim 3 wherein the second error code indicates that the test control apparatus is malfunctioning by allowing the current pressure to exceed the test pressure by a dangerously high percentage.

6. A method for leak testing of a part as defined in Claim 3 wherein said determining whether the current pressure monitored exceeds the test pressure value by a predetermined excess percentage level is performed utilizing a predetermined excess pressure percentage level of 25% greater than the test pressure value.

7. A method for leak testing of a part as defined in Claim 3 wherein the third error code indicates that a leak exists in the test part that prevents achieving of pressurization thereof to the test pressure value.

8. A method for leak testing of a part as defined in Claim 3 wherein the third error code indicates that a blockage exists within the test part that prevents achieving of pressurization thereof to the test pressure value in an area in fluid flow communication with respect to the pressure sensing means.

9. A method for leak testing of a part as defined in Claim 1 wherein said presetting of the test pressure value is performed to a value between zero and 200 pounds per square inch.

10. A method for leak testing of a part as defined in Claim 1 wherein said presetting of the test pressure value is performed to a value of approximately 90 pounds per square inch.

11. A method for leak testing of a part as defined in Claim 1 wherein said presetting of the standard pressure differential value is performed to a value between .015 and .050 pounds per square inch.

12. A method for leak testing of a part as defined in Claim 1 wherein said presetting of the standard pressure differential value is performed to a value of approximately .035 pounds per square inch.

13. A method for leak testing of a part as defined in Claim 1 wherein said presetting of the total test time is performed to a value of between 5 and 25 seconds.

14. A method for leak testing of a part as defined in Claim 1 wherein said presetting of the total test time is performed to a value of approximately 15 seconds.

15. A method for leak testing of a part as defined in Claim 1 wherein said presetting of the snapshot time delay is performed to a value between 2 and 6 seconds.

16. A method for leak testing of a part as defined in Claim 1 wherein said presetting of the snapshot time delay is performed to a value of approximately 4 seconds.

17. A method for leak testing of a part as defined in Claim 1 wherein said presetting of the slam test time is performed to a value between 0.5 and 2.0 seconds.

18. A method for leak testing of a part as defined in Claim 1 wherein said presetting of the slam test time is performed to a value of approximately 1.1 seconds.

19. A method for leak testing of a part as defined in Claim 1 wherein said presetting of the slam pressure differential value is performed to a value between .0001 and .0100 pounds per square inch.

20. A method for leak testing of a part as defined in Claim 1 wherein said presetting of the slam pressure differential value is performed to a value of approximately .001 pounds per square inch.

21. A method for leak testing of a part as defined in Claim 1 wherein said presetting is performed with the value of the slam pressure differential being set to a value

less than the value of the standard pressure differential value.

22. A method for leak testing of a part as defined in Claim 2 wherein said presetting of the maximum fill time is performed to a value between 1.5 and 4.0 seconds.

23. A method for leak testing of a part as defined in Claim 2 wherein said presetting of the maximum fill time is performed to a value of approximately 2.8 seconds.

24. A method for leak testing of a part as defined in Claim 2 wherein said presetting of the minimum fill time is performed to a value between 0.1 and 1.0 seconds.

25. A method for leak testing of a part as defined in Claim 2 wherein said presetting of the minimum fill time is performed to a value of approximately 0.4 seconds.

26. A method for leak testing of a part as defined in Claim 1 wherein said sealing of the test part includes positioning of at least one plugging fixture in engagement with the part to facilitate defining of an interior chamber therewithin for pressurization testing thereof.

27. A method for leak testing of a part as defined in Claim 26 wherein the fill line and the pressure sensing means are mounted to one of the plugging fixtures to facilitate fluid flow communication thereof with respect to the interior chamber defined within the part to be tested.

28. A method for leak testing of a part as defined in Claim 1 wherein said pressurizing of the test part by supplying fluid through the pressure fill line into the part is performed by supplying gas through the fill line into the test part for leak testing thereof.

29. A method for leak testing of a part as defined in Claim 1 wherein said pressurizing of the test part by supplying fluid through the pressure fill line into the part is performed by supplying air through the fill line into the test part for leak testing thereof.

30. A method for leak testing of a part as defined in Claim 1 wherein said determining the snapshot pressure value is performed once to determine a snapshot pressure value which remains fixed for the duration of the current test.

31. A method for leak testing of a part as defined in Claim 1 wherein said presetting of a plurality of test parameters further includes presetting of a next program number.

32. A method for leak testing of a part as defined in Claim 31 further comprising:

A. after depressurizing of the test part, determining whether a bad part result has been indicated and, if yes, then retain the first test parameters from said presetting of a plurality of test parameters and restart the leak testing method for a new part; and

B. monitor the next program number and, if equal to zero, then retain the first test parameters from said presetting of a plurality of test parameters and restart the leak testing method for a new part, and, if equal to a number greater than 0, then loading of those preset test parameters associated with the new test number for restarting the testing method for the previously tested part using the newly loaded test program parameters.

33. A method for leak testing of a part as defined in Claim 1 wherein said performing slam test is performed only once during each part testing sequence of steps and

wherein said performing standard test is performed at least once during each part testing sequence of steps.

34. A method for leak testing of a part as defined in Claim 1 wherein said presetting of a plurality of test parameters includes setting of the test pressure value to a value less than atmospheric pressure.

35. A method for leak testing of a part as defined in Claim 1 wherein said presetting of a plurality of test parameters includes setting of the test pressure value to a value greater than atmospheric pressure.

36. A method for leak testing of a part comprising:

A. presetting of a plurality of test parameters including:

(1) test pressure value;

(2) standard pressure differential value:

(3) total test time;

(4) snapshot time delay;

(5) slam test time;

(6) slam pressure differential value;

(7) maximum fill time;

(8) minimum fill time;

(9) next test program;

B. sealing of the test part with a fill line and a

pressure sensing means attached thereto in fluid flow communication with respect to the sealed environment therewithin;

C. initiating pressurizing of the part by starting the flow of fluid through fill line into the test part;

D. determining whether the current pressure monitored has reached the test pressure value prior to expiration of the minimum fill time, and if yes, set and display a first error code and activate a test failure indicator and proceed to depressurizing the test part;

E. determining whether the current pressure monitored exceeds the test pressure value by a predetermined excess percentage level thereof equal to 25 percent, and if yes, set and display a second error code and activate a test failure indicator and proceed to depressurizing the test part;

F. determining whether the current pressure has reached the test pressure value, and if yes, proceed to ceasing pressurization of the test part;

G. determining whether the maximum fill time has expired since initiating pressurizing of the part the current pressure has failed to reach the test pressure value, and, if yes, set and display a

third error code and activate a test failure indicator and proceed to depressurizing the test part, and if no, return to said determining whether the current pressure monitored has reached the test pressure value prior to expiration of the minimum fill time;

H. ceasing pressurization of the test part;

I. pausing for a period of time of a duration equal to the snapshot time delay;

J. determining the snapshot pressure value by measuring the instantaneous current pressure within the pressurized part;

K. calculating the low good standard threshold pressure by subtracting the standard differential value from the snapshot pressure value;

L. calculating the low good slam threshold pressure by subtracting the slam differential value from the snapshot pressure value;

M. measuring of the current pressure instantaneously within the part being tested;

N. delay for a period of time equal to the slam test time after determining the snapshot pressure value;

O. performing slam test once by determining whether the measured current pressure is greater than the low good slam threshold pressure value, and, if

yes, then proceeding to display the good part indicator and proceeding to depressurizing;

P. performing standard test by determining whether the measured current pressure is less than the low good standard threshold pressure, and, if yes, displaying bad part indicator and proceeding to depressurizing;

Q. further performing of the standard test repeatedly until expiration of the total test time and then, if all standard tests result in a no result, proceeding to display a good part indicator and depressurizing; and

R. depressurizing the test part.